Gerry E. Studds **Stellwagen Bank National Marine Sanctuary**

State of the Sanctuary Report

NOAA National Marine Sanctuaries

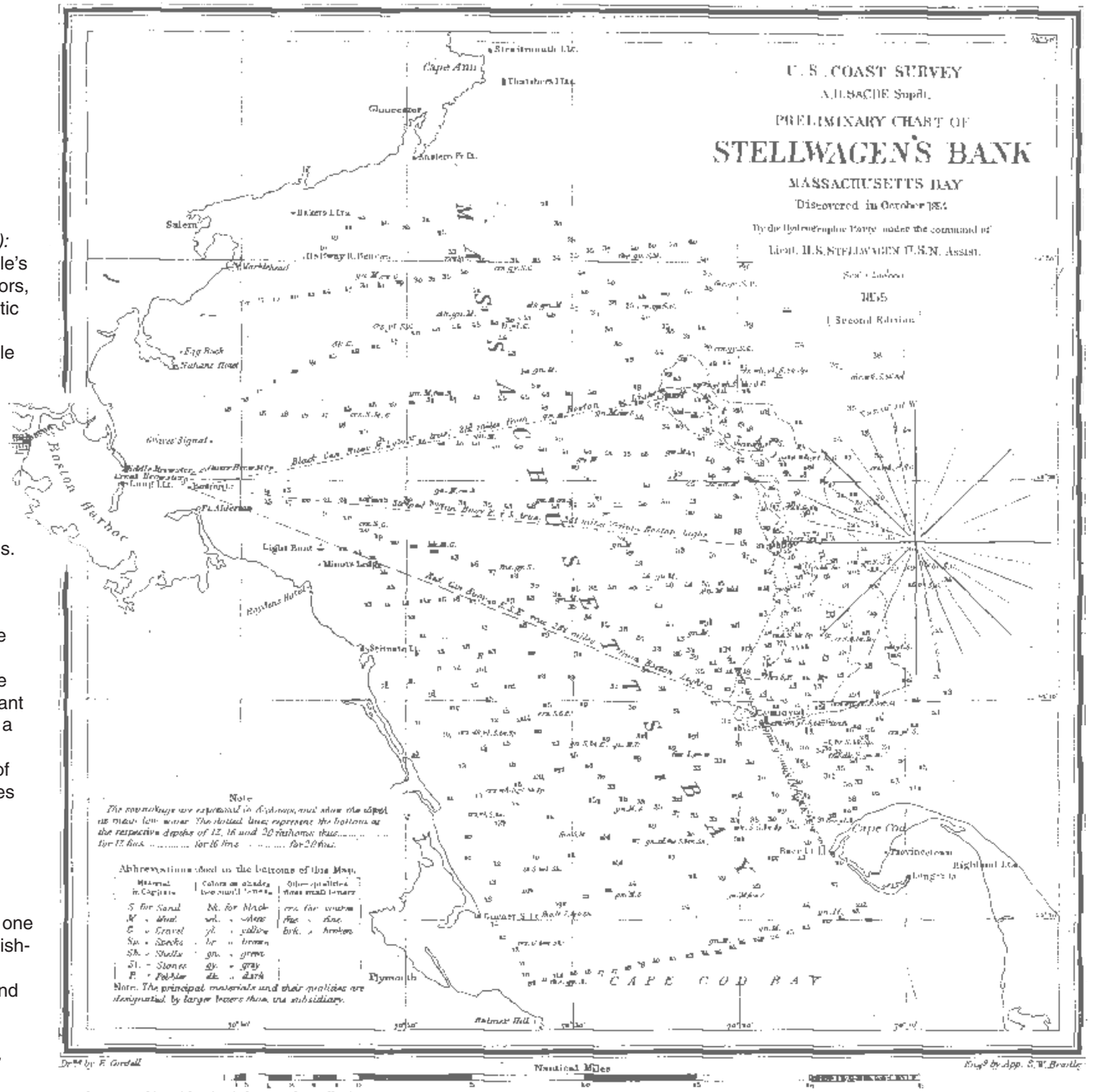
NOAA ocean SERVICE

Cover Photos (clockwise from top): The humpback whale's repertoire of behaviors, including the dramatic breach, makes it a favorite among whale watchers.
Photographer: Regina Asmutis-Silvia, IWC

A feeding whale means leftover baitfish for these enterprising seabirds.
Photographer: David Wiley, IWC

Efforts to restore the Atlantic cod, the Massachusetts state fish, to more abundant numbers has led to a groundfishing closure in the Gulf of Maine which includes a portion of the Sanctuary.
Photographer: SBNMS Dive Team

The stern trawler is one of several types of fishing boats to ply the waters on and around Stellwagen Bank.
Photographer: Regina Asmutis-Silvia, IWC.



From the Image Archives of the Historical Map & Chart Collection
Office of Coast Survey/National Ocean Service/NOAA

Commander Henry Stellwagen's 1854-1855 map of Massachusetts Bay shows a continuous bank at the mouth of the Bay. He wrote: "I consider the promulgation of the discovery a very essential thing to navigators and that the knowledge of it will highly benefit commanders and the great commercial interest of the City of Boston — and that it will serve as an invaluable aid to mariners bound in during thick weather by day or night."

This document introduces you to the Gerry E. Studds Stellwagen Bank National Marine Sanctuary and describes the site's activities and continuing management plan review process. For ready reference, an insert orients you to the range of issues and possible actions facing the Sanctuary, based on comments received during the previous public comment period and staff analysis. Please turn the pages, become familiar with the Sanctuary and learn how you can help guide future management of this very special place.

NATIONAL MARINE SANCTUARIES™

Stellwagen Bank

June 2002

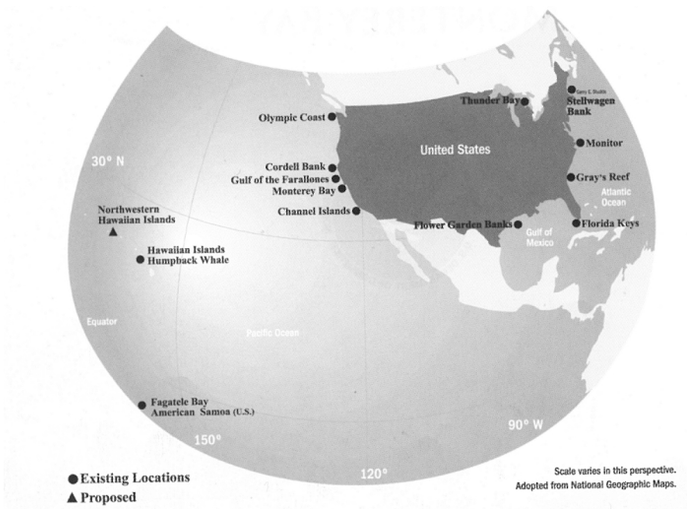
The National Marine Sanctuary Program

The National Marine Sanctuary Program, a network of 13 marine protected areas, encompasses marine and freshwater resources from Washington State to the Florida Keys, from Massachusetts to American Samoa, and from Lake Huron to the Gulf of Mexico. The National Oceanic and Atmospheric Administration's National Ocean Service has managed marine sanctuaries since passage of the Marine Protection, Research, and Sanctuaries Act of 1972. Title III of the Act is now also known as the National Marine Sanctuaries Act.

Today, our marine sanctuaries contain kelp forests and deep ocean gardens, near-shore coral reefs, areas for whale feeding, reproduction and migration, deep-sea canyons, and underwater archaeological sites. They range in size from one-quarter square mile in Fagatele Bay, American Samoa, to more than 5,300 square miles off Monterey Bay, California - one of the largest marine protected areas in the world. Together, these sanctuaries protect nearly 18,000 square miles of coastal, open ocean and Great Lake waters and habitats.

While some activities are managed to protect resources, certain multiple uses, such as recreation, commercial fishing and shipping, are allowed to the extent that they are consistent with a sanctuary's resource protection mandates. Research, education and outreach activities are other major components in each sanctuary's program of resource protection.

The National Marine Sanctuary Program is a world leader in ocean management placing a primary emphasis on the protection of our nation's living marine and submerged cultural resources.



National Oceanic and Atmospheric Administration

U.S. Secretary of Commerce
Donald L. Evans

Under Secretary of Commerce for Oceans and Atmosphere and Administrator, National Oceanic and Atmospheric Administration
Vice Admiral Conrad C. Lautenbacher, Jr. U.S. Navy (Ret.)

Assistant Administrator for Ocean Services and Coastal Zone Management, National Ocean Service
Margaret A. Davidson (acting)

National Marine Sanctuary Program Director
Daniel J. Basta

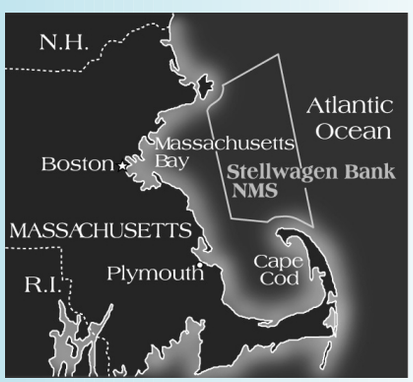
Stellwagen Bank National Marine Sanctuary Superintendent
Dr. Craig D. MacDonald

The Gerry E. Studds Stellwagen Bank National Marine Sanctuary

The Stellwagen Bank National Marine Sanctuary stretches between Cape Ann and Cape Cod at the mouth of Massachusetts Bay and is virtually the size of the state of Rhode Island. Its boundaries include the submerged lands of Stellwagen Bank, all of Tillies Bank and Basin, and the southern portions of Jeffrey's Ledge. The Sanctuary protects 842-square miles in a topographically diverse area geologists calculate was created some14,000 years ago during retreat of the last Great Ice Age glaciers. Then, Stellwagen Bank was emergent land and mastodons and wooly mammoth roamed about.

Today, whales swim where mastodons trod, and the Sanctuary has become home to a wide variety of marine mammals, seabirds, fishes and invertebrates. Notably, the Sanctuary is recognized as one of the primary feeding grounds of the highly migratory humpback whale in the North Atlantic. It is the part-time home of the endangered northern right whale, of which 300 are estimated to survive. Its varied seafloor topography supports a high diversity of demersal fish species. It is one of only a few areas in the Gulf of Maine (including Jeffreys Ledge and the Great South Channel) that seasonally aggregate Atlantic bluefin tuna in large numbers. And, it is an area of exceptionally high primary productivity and production.

With concentration of such great resource diversity and production potential in one place, the Sanctuary attracts extensive commercial, recreational, scientific and educational uses. Located in the backyard of an estimated 6 million people living in the greater Boston metropolitan area, it enjoys tremendous possibilities for education and outreach. And, situated amidst literally dozens of prestigious research institutions, highly regarded non-governmental organizations and functionally related state and federal government agencies, the Sanctuary has exceptional opportunities for partnership and cooperation.



Mission

To conserve, protect, and enhance the biodiversity, ecological integrity, and cultural legacy of the Sanctuary through carefully conceived programs of resource management and responsible stewardship.

For More Information

Address:
Gerry E. Studds
Stellwagen Bank National Marine Sanctuary,
175 Edward Foster Rd.,
Scituate, MA 02066

Telephone:
781-545-8026

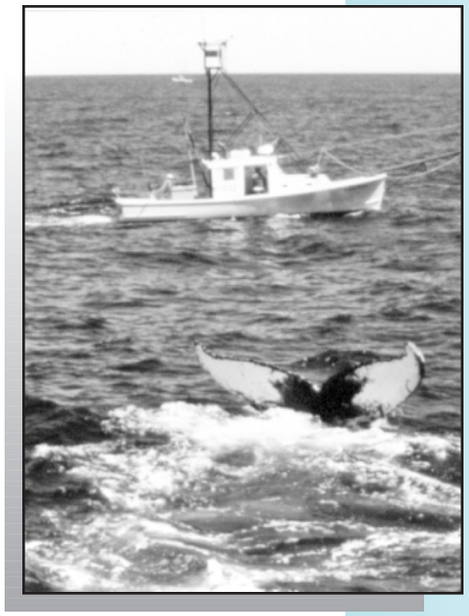
Fax:
781-545-8036

General e-mail:
stellwagen@noaa.gov

Management Plan e-mail:
sbnmsplan@noaa.gov

Web Site:
http://stellwagen.nos.noaa.gov

Contents



Multiple demands on Sanctuary resources make development of a management plan a challenging but rewarding process.

Photographer: David Wiley, IWC

Management Plan Review

Management plans are Sanctuary-specific documents that perform many functions, including describing regulations and boundaries; outlining staffing and budget needs; setting priorities and performance measures for resource protection, research, and education programs; and guiding development of future budgets and management activities. Management plan review, required by law for all National Marine Sanctuaries, is conducted to ensure that each site properly conserves and protects its nationally significant living and cultural resources.

The Stellwagen Bank National Marine Sanctuary's existing management plan was published in July 1993. In December 1998 and January 1999, the Sanctuary initiated review of its management plan by holding "scoping" meetings to ask the public for comments on the status of site management. Scoping comments generally include a broad range of information on scope, types and significance of issues related to the Sanctuary's management. The management plan review process continues with distribution of this document as the forerunner to additional scoping meetings and the public comment period planned for Summer 2002.

During the initial scoping meetings of 1998/99, participants identified concerns in need of further attention. Characterized as "issues," the following themes emerged as the general areas of concern. The order of listing does not imply priority. Future public comment on management of the Sanctuary is not limited to this or any given set of issues.

- Alteration of seafloor habitat and ecosystem protection
- Impacts of human activities on marine mammals
- Condition of water quality
- Lack of public awareness, and
- Effective enforcement

Over the course of the next one-two years, management plan review will continue to be a community-based process, providing numerous opportunities for public participation. Many of you live near, use or intrinsically value this special place that is Stellwagen Bank National Marine Sanctuary. The management plan review process is your chance to provide important input regarding the Sanctuary's future and to ensure that its resources are protected, conserved and properly used for benefit of current and future generations. Reading this document should stimulate your interest in the existing management plan and, ultimately, in future management of the site.

Sanctuary Background

Generally Speaking

The Stellwagen Bank National Marine Sanctuary is a very special place. The Stellwagen Bank area was designated a National Marine Sanctuary because of its remarkable biological, geological, oceanographic and cultural features. The Sanctuary is mandated by Congress to protect these unique attributes, while allowing people to use and enjoy this ocean area in a sustainable way compatible with resource protection. The Sanctuary provides research and education programs to promote understanding of these resources and guide responsible management, as well as enforcement to assure regulatory compliance and safe use.

Designation History

In the late 1980s, an elevated public awareness of regional development activities prompted calls for greater protection of New England's marine resources. During the summer of 1989, a series of public meetings revealed the public's concern about the impacts of certain human activities on the Stellwagen Bank ecosystem. By 1991, NOAA had received over 20,000 petitions in support of the creation of the Stellwagen Bank National Marine Sanctuary, which had been an active candidate for designation since the mid-1980s.

On October 7, 1992, Congress passed legislation re-authorizing and amending Title III of the Marine Protection, Research, and Sanctuaries Act (Title III). Stellwagen Bank National Marine Sanctuary was officially designated when that legislation was signed into law on November 4, 1992. In 1996, the Sanctuary's name was officially changed to the Gerry E. Studds Stellwagen Bank National Marine Sanctuary to honor the retiring Congressman who had played an integral role in its creation. For purposes of ease of reading this publication, general reference will simply be made to the Sanctuary.

Related Jurisdictions

Management of the Sanctuary involves cooperation and coordination with the following federal and state agencies having regulatory responsibilities in related jurisdictions. Regular information exchange and partnership with these agencies, as well as coordination and formal consultation on related policies and rule making for resource protection, is crucial to the effectiveness of the Sanctuary's programs. Sanctuary enforcement of regulations pursuant to the enabling acts of other federal agencies having overlapping jurisdiction with the Sanctuary is possible through formal agreement. Cooperation, coordination and consultation with these agencies is clearly vital to comprehensive resource management.

Captain Henry S. Stellwagen faithfully served his nation in times of war and peace. His legacy includes an underwater feature and a National Marine Sanctuary bearing his name.

Photograph courtesy of the Stellwagen Family

The 133' NOAA Ship *Ferrel* (top photo) and the 76' Research Vessel *Connecticut* provide valuable platforms for studying the biodiversity and geology of the Sanctuary.

Photographers: (Ferrel) James Hain, ASWH (RV Connecticut) University of Connecticut website

The U.S. Coast Guard is broadly responsible for law enforcement in waters under federal jurisdiction. NOAA's National Marine Fisheries Service (NMFS) and the New England Fisheries Management Council (NEFMC) are responsible for fisheries management. The NMFS also regulates activities under the Marine Mammal Protection Act and the marine component of the Endangered Species Act. The NMFS Office of Law Enforcement shares responsibilities with the Coast Guard in enforcing these laws. The U.S. Environmental Protection Agency regulates sewage outfalls and ocean disposal activities. Certain ocean disposal activities, such as harbor dredge spoils dumping, also are permitted and monitored by the US Army Corps of Engineers. The U.S. Fish & Wildlife Service regulates activities effecting seabirds and waterfowl.

Although the Sanctuary lies entirely outside of state jurisdiction, communication and coordination with agencies of The Commonwealth of Massachusetts is necessary and beneficial. The Massachusetts Environmental Police are partners in Sanctuary enforcement with the NMFS Office of Law Enforcement and the Coast Guard. The Massachusetts Office of Coastal Zone Management works broadly with the Sanctuary to assure consistency in state-federal activities effecting coastal and ocean waters. The Massachusetts Division of Marine Fisheries manages marine resources, many of which are highly mobile and whose populations overlap Sanctuary and state waters in their geographic distribution. The Division also is a voting member of the NEFMC and thereby participates in management of fishery resources under federal jurisdiction.

Sanctuary Setting

The Sanctuary is located in the southwestern corner of the Gulf of Maine, which is formed by the bight of the northwest Atlantic coastline between Cape Cod, Massachusetts and Cape Sable, Nova Scotia. Massachusetts Bay lies between Cape Ann in northern Massachusetts and Cape Cod in southern Massachusetts. The Bay's most prominent submarine feature is Stellwagen Bank, a shallow, glacially deposited and primarily sandy feature that curves in a southeast to northwest direction for nearly 20 miles. Water depths at Stellwagen Bank range from 65 feet to more than 300 feet. Seaward of the Bank, the seafloor slopes to depths of more than 600 feet.

At its greatest distance from the coast, the Sanctuary is located approximately 25 miles east of Boston. However, its northern and southern bounds are only 3 miles offshore respectively of Gloucester and Provincetown. The Sanctuary boundary occurs entirely within federal waters (beyond the 3-mile limit of Massachusetts Commonwealth jurisdiction) and encompasses the entire Stellwagen Bank, all of Tillies Bank and Basin, and the southern portion of Jeffreys Ledge.

The Sanctuary's complex seafloor topography influences current flow and site productivity. In general, surface currents flow counterclockwise over Stellwagen Bank. Site productivity is seasonal with the overturning and mixing of ocean waters from deeper strata producing a complex and rich system of overlapping midwater and benthic habitats. This heightened seasonal productivity supports a large variety of marine mammal and fish species.

The Sanctuary serves as a critical feeding ground for numerous whales and other marine mammals, several of which are endangered. It may also be an important nursery area for certain of these species. The Sanctuary's multiple habitat types support a high diversity of fish species and an impressive assemblage of invertebrates. And, its rich forage base provides productive habitat for a wide variety of coastal and pelagic seabirds.

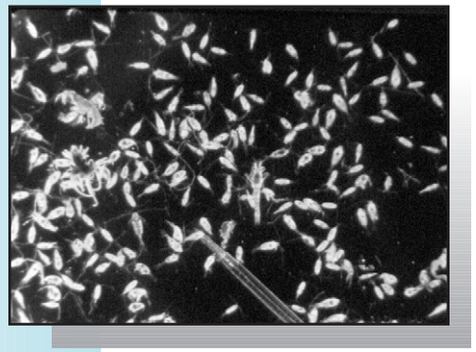
Resource Highlights

The Sanctuary encompasses within its boundaries each of the four major seafloor habitat types - piled boulder, gravel, sand and mud - found in the Gulf of Maine. These habitats are spread across the series of banks and deep basins that make the Sanctuary the diverse topographic area that it is. This unique seafloor topography combines with tidal currents, seasonal mixing and annual circulation patterns to support a diverse array of species, from microscopic phytoplankton to large marine mammals.

Plankton - Life in the Water Column

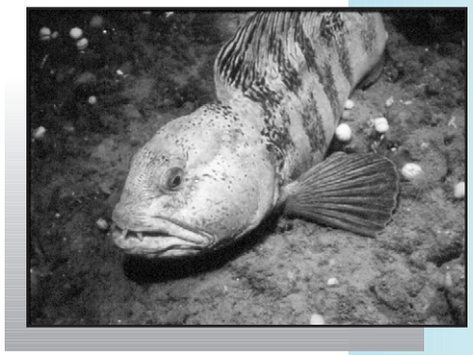
The highest concentration of phytoplankton, and resulting peak in primary productivity, in the Sanctuary occurs from December through early April. During this period, more than 675 species of phytoplankton have been documented. Although there are common species occurring throughout the year, this spring bloom is characterized by both a higher number of species and higher overall abundance. A second, less-marked period of heightened productivity also occurs in mid to late summer, during July and August.

In contrast, the number of species of zooplankton (or secondary producers) in the Sanctuary remain relatively constant throughout the year. Though zooplankton do not experience seasonal fluctuations of the same magnitude as phytoplankton species, there is a distinct seasonal pattern to their abundance. Zooplankton production begins along coastal waters of Massachusetts north of Cape Ann during March. Production continues to expand throughout the southern Gulf of Maine and the Sanctuary throughout April, peaking by the end of May. The vast majority of the zooplankton species occurring in the Sanctuary is endemic to the Gulf of Maine.



The rich plankton community includes numerous types of small drifting animals but none more important than the ubiquitous copepods. Each copepod is smaller than a grain of rice, yet these tiny crustaceans provide sustenance to many creatures, including the massive northern right whale.

Photographers:
(zooplankton) Tom Kleindinst, WHOI;
(copepod close-up) NMFS staff



Studies of the seafloor show how different species use their habitats, such as the colorful redfish, pictured here sheltering among northern cerianthid anemones, and the fearsome-looking wolffish, which often hides in crevasses between boulders.

Photographers: (both photos) Peter Auster and Paul Donaldson, NURC-UConn

Benthic Invertebrates - Life on the Seafloor

Every major taxonomic group of invertebrates that occurs in the global marine environment occurs in the Sanctuary specifically. Benthic invertebrates occur throughout the Sanctuary across all seafloor habitat types and constitute the major component of biological diversity. While large cerianthid anemones may be the most visible in a deep mud basin, sand dollars and sea stars might dominate the shallower sand areas. Structure-forming epifaunal invertebrates (such as sponges and anemones) provide critical nursery habitat for juvenile fish of many species (such as Atlantic cod and Acadian redfish), while the greater invertebrate community provides an important source of food for these and many other fish species in the Sanctuary.

A Diversity of Fishes

Fish are a vital component of the Sanctuary's biological diversity, and are also one of its strongest links to the human population. The diverse seafloor topography in the Sanctuary supports a wide array of fishes. For instance, of the 176 fish species captured in more than two decades of government trawl surveys throughout the Gulf of Maine, 66 of those species have been sampled in the Sanctuary. Fish found in the Sanctuary range in size from small snake blennies to basking sharks, the largest of the fish occurring in the Sanctuary. Some fish, such as giant blue fin tuna, are annual migrants to the area, while others, such as Acadian redfish, are likely year-round residents.

The groundfish community in the Sanctuary, made up of fishes such as cod, haddock, whiting (silver hake), and various flatfish, has been sought for food from the earliest European settlements to the present. And the sand lance, whose populations are seasonally prolific in the Stellwagen Bank environment, serves as the primary prey of Humpback whales feeding within the Sanctuary.

Sea Turtles Among Us

The Sanctuary is the seasonal home to two species of endangered sea turtles, the Atlantic or Kemp's ridley and the leatherback. The leatherback is a regular summer visitor and is the only species of sea turtle that journeys to cold waters for feeding activities. Likely prey include jellyfish and other jelly organisms abundant in these waters during the summer. Atlantic ridleys are observed in waters off Massachusetts as juveniles, having either swum or drifted north in the Gulf Stream from hatching areas off the southern coast of Mexico. Southern New England waters are important feeding grounds for ridleys.

Whales on the Horizon

Large cetaceans are the most visible occupants of Sanctuary waters. Seventeen species are known to frequent the Sanctuary, and rare sightings of two additional species have been recorded. Because of their large size, flamboyant behavior, and distinctive markings, Humpback whales (*Megaptera novaeangliae*) are perhaps the most observed and easily identified of the Sanctuary's cetaceans. Feeding assemblages of over 40 animals are common during the Spring, Summer and Fall. The species was first scientifically described based on observations made of an individual taken off the coast of Maine, and hence, the Latin name *novaeangliae*, which means "New England."

Northern right whales are the most seriously depleted species of large cetaceans. Given its endangered status, the photo-identification of at least 100 northern right whales using the Sanctuary and adjacent waters seasonally indicates the particular importance of this system to a significant portion (about one third) of the existing total North Atlantic population for feeding and nursing activities. Fin (or Finback) whales, the second largest of the World's whales, are the most common species of large baleen whale in the Gulf of Maine and are regularly seen in the Sanctuary, along with the smaller Minke whales.

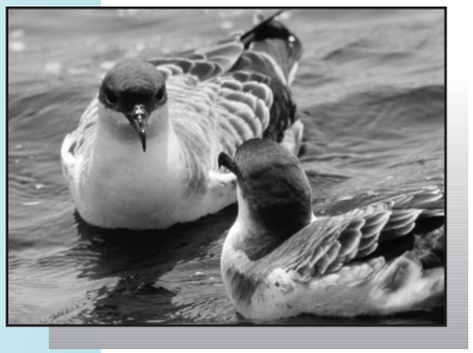
The most frequently observed toothed-cetacean is the white-sided dolphin, with single groups sometimes numbering over 1,000 individuals. Pilot whales and harbor porpoise are also frequent. Orca (or killer) whales are occasionally observed on Stellwagen Bank, where they are thought to follow schools of bluefin tuna from mid-July to September.

The Presence of Pinnipeds

Two pinniped species are known to occur in Sanctuary waters, the harbor seal and the gray seal, though neither are common. Harbor seals, the more common of the two species in the Sanctuary, range from Labrador to Long Island, New York, and is the most abundant pinniped species in eastern United States waters. Gray seals are the most abundant pinniped species occurring in southern areas of eastern Canada, from Labrador south through the Bay of Fundy.

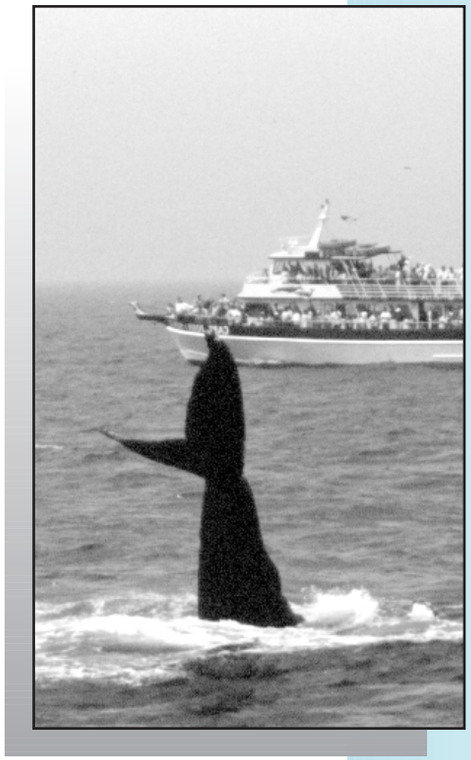
An Abundance of Seabirds

Over 40 species of marine birds are found throughout the year in the vicinity of the Sanctuary. The distribution and abundance of seabird species in the Sanctuary are related, as they are in other parts of the Gulf of Maine, to the availability of preferred prey (such as fish and fish larvae, cephalopods, crustaceans and offal). With a single exception (Leach's storm petrel), all seabirds occurring within the Sanctuary are either migrants or non-breeding residents. The high levels of biological productivity in the Sanctuary, combined with the presence of fishing vessels, result in a predictable and abundant variety of associated species of both coastal and pelagic seabirds.



An active feeding aggregation of humpback whales breaks the sea surface indicating that a school of sand lance is in the area. Seabirds, such as these greater shearwaters, also rely on the bounty of Stellwagen Bank.

Photographers:
(whales) David Wiley, IWC;
(birds) Dann Blackwood, USGS



Whalewatching operations from numerous ports along the Massachusetts coast bring over three-quarters of a million visitors to the Sanctuary each year.

Photographer: Regina Asmutis-Silvia, IWC

Human Uses

Whale Watching

Historically important as a fishing ground, Stellwagen Bank is now one of the premiere whalewatching destinations in the world. Whalewatch vessel entry to the Sanctuary comes primarily from eight ports along the coast of Massachusetts Bay, but occasionally also from New Hampshire and southern Maine. Since the mid-1970s, whalewatching has become an economically and educationally significant activity in the Sanctuary. In fact, over 90% of all New England regional whale-watching effort occurs within the Sanctuary boundaries.

In 1997, the most recent data year, direct gross sales revenues in the New England region for whalewatching were estimated at around $21 million. At least 10 million people went whalewatching in the Sanctuary between 1975 and 1993. An estimated 864,000 individuals went whalewatching there during the 1996 season alone. On an annual basis, these numbers are generally believed to have since increased.

Whalewatch companies often provide naturalist services during the trip, which expand the experience into an educational event for passengers. This service offers a promising avenue to instill a stewardship ethic in Sanctuary visitors and raise their awareness about how human activity can impact Sanctuary resources. It also provides an important means to raise the visibility of the Sanctuary among a varied and interested public. And, research indicates that whalewatch companies will realize greater marketing advantage, if they advertise that their whalewatching will be conducted within the Sanctuary.

Whalewatch vessels can contribute to research on the interaction, associations and behaviors of the whales that come to the Sanctuary to feed. The Sanctuary humpbacks may be the best and most consistently studied whales in the world due to the efforts of several local scientific research organizations, often working in conjunction with whalewatch companies. Whalewatch vessels can serve as invaluable data collection platforms for research activities on Sanctuary animals, activities that otherwise would have been greatly curtailed due to cost.

Commercial Fishing

Historically, the yield from groundfish, invertebrate, and pelagic fisheries was a singularly important commercial resource for the New England region beginning in the Colonial Period. Today, commercial fishing remains among the more important sources of revenue for the New England coastal states. Precise estimates of the fishing effort, and associated landings, applied to the Sanctuary on a seasonal and annual basis are currently not available, but continue to be a matter of significant interest.

Three hundred years ago, catches were abundant from local coastal waters and the need to venture to distant offshore banks was small. Handlines employed from small skiffs and sail craft yielded modest daily catches while weirs or traps placed at river mouths or harbors captured plentiful amounts of migratory fish. However, the country's rapid growth increased pressure to extend fishing effort to offshore locations. Subsequent advancements in vessel propulsion, from sail to steam to diesel power, increased significantly the distance off-shore that fishermen could fish, the size and types of gear they could deploy, and ultimately their fishing power and harvesting efficiency. This, coupled with introduction of the otter trawl, led to major increases in annual catch.

In the 1960s, large foreign trawlers began fishing the region for non-traditional species, such as hake, herring and squid. By the 1970s, vessels from a wide variety of countries had begun targeting more traditional local species, such as haddock. New England fisheries began to suffer biologically and economically. Because there was no effective management of fisheries outside the existing U.S. 12-mile contiguous zone, the Magnuson-Stevens Fishery Conservation and Management Act of 1976 was passed to extend U.S. management jurisdiction out to 200 nautical miles from the shoreline. This action reduced the level of foreign fishing in the Gulf of Maine, but compensatory increases in domestic fishing capacity through the 1980s and 1990s contributed to overfishing and stock collapses.

Today, a reduced but still extensive and active domestic commercial fishery continues throughout the southwestern Gulf of Maine and surrounding waters, although faced with serious problems of over-capacity and operating under a complex regulatory regime intended to rebuild fish populations. Stellwagen Bank is one of several areas receiving concentrated fishing effort, as is Jeffreys Ledge, Cashes Ledge, Tillies Bank, Brown Bank and the more expansive Georges Bank. Fishing with mobile gear, such as trawls, together with fixed gear, such as bottom-tending gill nets and lobster pots, occurs extensively throughout the Sanctuary. Commercial operators take species from four principal categories: groundfish, pelagics, other finfish and invertebrates.

Recreational Fishing and Boating

The Sanctuary is a popular destination for recreational fishing boats, sailboats and powerboats. Recreational fishing, from party boats, charters and private boats, is regularly directed at fish from cod to bluefin tuna inside the Sanctuary. There are 65 small boat harbors and over 80 boating and yacht clubs sited along the Massachusetts coast giving access to the Sanctuary. Recreational boaters typically transit the Sanctuary going to and from Boston, coming from the Cape Cod Canal or Cape Cod Bay, and from

Fishing has been a New England tradition for centuries, and fishing vessels continue to be a common sight on Stellwagen Bank, including trawlers (top photo) and gill netters (bottom photo).

Photographer:
(both photos) David Wiley, IWC

Transiting the Sanctuary are a range of large cargo vessels, such as this car carrier, as well as high speed ferry service. The official shipping lanes to Boston pass directly over Stellwagen Bank.

Photographer: (both photos) David Wiley, IWC

Provincetown or Cape Ann. Recreational boaters are most numerous and often aggregate within the Sanctuary during the whalewatching season from May to September. On a calm summer day, recreational boats can number in the hundreds over Stellwagen Bank.

Commercial Shipping, Ferries and Cruise Ships

The Sanctuary area can be described as the "gateway" to maritime commerce of Massachusetts. As one of the busiest ports in the country, Boston sustains great amounts of commercial shipping traffic. Shipping lanes designated for entry and exit to and from the Port cross the Sanctuary, with vessels plying natural gas, cars from Europe and the Far East, and regional freight, for example. Ferry service crosses the Sanctuary in route to Provincetown from Boston, and ferry service between Portsmouth (NH) and Provincetown, that would cross the Sanctuary, is proposed. Such ferries operate at high speeds in excess of 30 knots. Cruise ship activity has been increasing and is heavily promoted for the Port of Boston.

Fiber Optic Cable

A fiber optic cable was laid across the northern part of the Sanctuary under federal permit in 2000. This cable provides a direct link between North America and the Republic of Ireland. The cable is designed for a life expectancy of 25 years and is buried at an average depth of approximately 1.5 meters into the seafloor. The cable was laid using a sea plow controlled from a cable ship on the surface. While an advisory to mariners has been posted to alert vessels to the cable's position, recent research suggests the cable may be at risk of exposure and damage, where it is routed through muddy basins subjected to fish trawling or dredging. Other regional proposals exist for further fiber optic cable laying, which could have additional impacts on the Sanctuary.

Waste Disposal

The western Sanctuary boundary abuts the Massachusetts Bay Disposal Site (MBDS), which serves as a repository for material dredged from the harbors of Boston and nearby cities. Most harbors and navigation channels of New England require periodic maintenance dredging to remove sediments that accumulate over time. Because these fine-grained sediments are not suitable for use as fill or for beach nourishment, they are disposed of at several locations in Massachusetts and Cape Cod Bays.

The MBDS is one such location and has been used since the 1940s, first as a dumping area for industrial wastes, construction debris, deliberately sunken derelict vessels, and for some dredged material considered to be contaminated. Today the MBDS is approved for ocean disposal of dredged material, which must conform to the Environmental Protection Agency's Ocean Dumping Criteria regulations.

Between 1940 and 1970, several other locations throughout Massachusetts Bay were also used for the disposal of various industrial waste products, these activities being largely unrecorded and unregulated. While no longer allowed, the disposal of low-level radioactive wastes during 1940s and 1950s was permitted at four sites within Massachusetts Bay. The most frequently used was the Industrial Waste Site located proximate to the westward edge of the Sanctuary boundary and in the general vicinity of the MBDS.

The Sanctuary's western boundary lies 12 miles seaward of the Massachusetts Water Resources Authority ocean outfall that discharges treated sewage effluent from several cities and towns, including Boston into Massachusetts Bay. This outfall discharges an average of 350 million gallons of secondary treated sewage daily. Additional capacity exists to discharge larger volumes, if needed.

A less apparent impact on the site involves vessels that legally dump graywater and head waste at sea within the boundaries of the Sanctuary. If the head waste has been treated with an authorized Marine Sanitation Device pursuant to section 312 of the Clean Water Act, its dumping is allowed under Sanctuary regulations. This practice pertains to all vessels, commercial and recreational, that use or transit the Sanctuary.

Management Functions

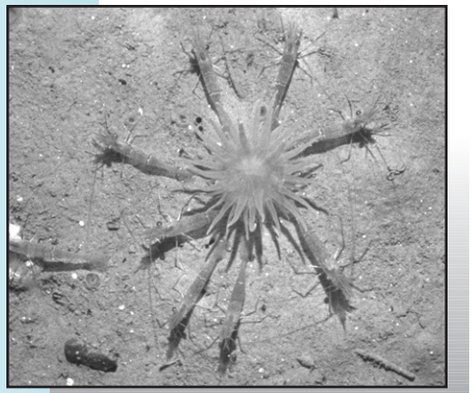
A major focus of the Sanctuary is to demonstrate and develop connections - between components of the ecosystem, between human activity and the marine environment, and between a healthy economy and a sound resource base. In developing these connections, the Sanctuary develops programs with numerous partners in four general functional areas:

Resource Protection to influence positive human behavior and activities that promote a healthy ecosystem. This program element focuses on altering or preventing human activities that may adversely affect Sanctuary resources by promulgating regulations, providing enforcement or incentives, and drawing upon education and outreach to inform the public.

Research and Monitoring to understand how the components of the ecosystem connect to each other, how the biological communities function naturally, how human activities affect the natural system, and how ecosystem changes over time relate to natural perturbations and human-induced factors. This knowledge, taken in context with pertinent socioeconomic information, is crucial to properly inform the management process.

Education and Outreach to connect people who live on land to the offshore Sanctuary by teaching about the value of a protected ocean ecosystem and how human activities can affect it. This function explains the nexus between a viable economy and healthy Sanctuary resources. It communicates what individuals, groups and businesses need to understand in order to contribute to effective stewardship.

Program Support to effectively administer project activities and initiatives that facilitate operations and meet the Sanctuary's mission. This function translates administrative capacity into productive outputs and, in addition to program budget, is reliant on organized volunteerism and "Friends" contributory support.



An ordered arrangement of shrimp find protection under the open tentacles of an anemone — a relationship photographed by geologists studying the Sanctuary seafloor.

Photographer:
U.S. Geological Survey

Implementation Status for the Stellwagen Bank National Marine Sanctuary 1993 Management Plan

Since designation in 1992, the Sanctuary has made substantial progress in developing programs for resource protection, research and monitoring, education and outreach. However, funding and staffing limitations and the need to respond to immediate and emerging issues have prevented the Sanctuary from fully achieving the ambitious plan set forth by the public and NOAA in the 1993 management plan. The following matrix summarizes the relative degree of success the Sanctuary has had in implementing the plan to date.

GOALS AND RESPONSIBILITIES	IMPLEMENTED AND ON-GOING	NOT IMPLEMENTED
Resource Protection		
Coordinate policies and procedures with other agencies currently possessing resource protection responsibilities in the Sanctuary	✔	
Work with other agencies to develop new procedures to address specific management concerns	✔	
Enforce Sanctuary regulations and enhance enforcement of regulations	✔	
Prepare a Sanctuary contingency and emergency response plan	✔	
Develop a Geographic Information System database of resources at risk	✔	
Develop procedures for emergency research		✔
Provide guidelines for damage assessment		✔
Develop cooperative agreements to improve oil/chemical spill detection programs and to enhance containment capabilities	✔	
Monitor commercial and recreational activities within the Sanctuary	✔	
Encourage other agencies to monitor activities in the Sanctuary	✔	
Improve overall detection of areas for particular management concern	✔	
Exchange information on commercial and recreational activities occurring within the Sanctuary	✔	
Consult with other agencies on proposals and policies for management of activities which may affect Sanctuary resources	✔	
Develop materials designed to enhance public awareness and appreciation of Sanctuary resources and show the need for their protection	✔	
Analyze human use patterns to determine any increased need for enforcement surveillance in the Sanctuary	✔	
Evaluate Sanctuary enforcement effectiveness, after two years and then annually	✔	
Hold periodic meetings with enforcement personnel to determine adequacy of surveillance		

Implementation Status

GOALS AND RESPONSIBILITIES	IMPLEMENTED AND ON-GOING	NOT IMPLEMENTED
Research and Monitoring		
Develop a baseline study to determine features and processes of the environment	✔	
Develop baseline studies to determine the abundance, distribution and interactions among the living resources	✔	
Monitor changes in the Sanctuary's ecology:	✔	
Species population dynamics	✔	
Cetacean abundance	✔	
Seabird abundance		✔
Effects of sport and commercial fishing	✔	
Effects of whale watching	✔	
Monitor changes in environmental quality (including pollution)	✔	
Monitor changes in human activities in the Sanctuary	✔	
Develop predictive studies to assess causes and effects of ecological and environmental changes, and to anticipate management issues	✔	
Prepare annual Sanctuary Research Plans	✔	
Monitor progress on research conducted in the Sanctuary	✔	
Conduct research workshops	✔	
Assist research exchange effort by making Sanctuary research databases available to other agencies and private institutions	✔	

GOALS AND RESPONSIBILITIES	IMPLEMENTED AND ON-GOING	NOT IMPLEMENTED
Education and Outreach		
Develop literature about resources and programs to reach Sanctuary on-site users, including whalewatch passengers, recreational boaters, charter boat operators, researchers and educators	✔	
Establish a Plymouth Headquarters Office with visitor center and interpretive materials in both print and audio-visual form	✔	
Provide information about other private and governmental activities occurring within or near the Sanctuary	✔	
Provide information about how the Sanctuary program coordinates with other public and private institutions or agencies to ensure ecosystem protection	✔	
Provide information about the National Marine Sanctuary Program	✔	
Conduct outreach programs for schools and universities	✔	
Develop curriculum materials and other teacher aids	✔	
Conduct off-site outreach programs for the general public, when possible in conjunction with regional environmental study organizations	✔	
Develop on-site visitor programs for fishing and whalewatching vessels, and other recreational boating visitors to the Sanctuary	✔	
Develop visitor center programs for the general public		✔
Provide information for use by whalewatch naturalists	✔	
Co-sponsor special excursions to the Sanctuary with regional Non-Governmental Organizations	✔	
Make Sanctuary materials available at other visitor centers and offices, including NMFS Regional Office and Cape Cod National Seashore	✔	
Develop travelling exhibits	✔	
Develop outreach materials for highway welcome centers	✔	
Develop outreach materials for public docks	✔	

GOALS AND RESPONSIBILITIES	IMPLEMENTED AND ON-GOING	NOT IMPLEMENTED
Program Support		
Prepare annual operating plan	✔	
Assist in coordination of surveillance and enforcement activities	✔	
Coordinate regularly with commercial and recreational fishing representatives primarily through the Sanctuary Advisory Council	✔	
Report regularly to headquarters on enforcement and emergencies	✔	
Provide information for training of enforcement officials	✔	
Monitor and evaluate the adequacy of emergency response plans	✔	
Maintain a record of emergency events in and around the Sanctuary		✔
Evaluate overall progress toward resource protection objectives and prepare semi-annual and bi-monthly progress reports for headquarters	✔	
Forward recommendations to headquarters for Sanctuary use permits	✔	
Make available appropriate training for staff	✔	
Review management plan periodically and recommend changes to headquarters	✔	
Represent the Sanctuary at public forums	✔	
Ensure that staff includes a Manager, administrative assistant, research coordinator, education coordinator, and one or more enforcement/interpreter positions	✔	
Determine need for additional staffing	✔	
Establish a headquarters office and visitor center facility in Plymouth	✔	
Consider establishment of a satellite office in Provincetown, Gloucester or Hull	✔	

The Sanctuary's move to its Scituate headquarters (a former Coast Guard Station) provides additional and much-needed space for staff offices, meeting space and storage. The boat house and dock, pictured here with the NOAA boat *Hawk*, offer easy access to Sanctuary waters.

Photographers: (main building) NOS staff; (boathouse) SBNMS staff

On-Going Activities

Over the past few years, largely since the previous scoping meetings, the Sanctuary initiated a number of key projects that merit elaboration. Activities associated with these projects are summarized below. Over the same timeframe, Sanctuary staffing increased from five positions to nine and the budget was increased to address expanding site needs. This added capacity has contributed greatly to the work being done.

Capital Investments in Infrastructure

Legislation passed by Congress in 2001 authorized transfer of Coast Guard Station Scituate to NOAA to serve as the Sanctuary's headquarters. These facilities, including the main building, garage, boathouse and piers, provide space for current and future staff as well as partnering state and federal agencies working collaboratively with the site. These partners include the Massachusetts Environmental Police, the National Marine Fisheries Service Office of Law Enforcement, and the Massachusetts Coastal Zone Management Program. The Sanctuary recently completed a facility development plan and is embarking on a $1 million renovation.

Funds to upgrade and acquire a more capable research vessel are being sought. The Sanctuary's existing boat, the 30' *Hawk*, has grown unreliable, is inadequate for our use, and is in need of replacement. A call for preliminary proposals for a new boat was issued in 2001, and a potential builder has been identified. Field trials on a representative boat have been conducted. A naval architect has been retained to assist with developing final specifications for the boat and inspection of its construction. NOAA's Office of Marine and Aircraft Operations will assist in procurement and provide oversight.

Sanctuary Advisory Council

Public involvement in Sanctuary management is vitally important to the National Marine Sanctuary Program (NMSP). One key to achieve this involvement is formation of a Sanctuary Advisory Council (SAC) for each site. A SAC brings together members of a diverse community to provide advice to the Sanctuary Superintendent on the management and protection of the Sanctuary. Section 315 of the National Marine Sanctuaries Act authorizes the Secretary of Commerce to establish SACs. This authority has been delegated to the Director of the NMSP.

A revised SAC Charter for the Sanctuary and new membership received approval by the NMSP Director in 2001. The SAC for the Sanctuary is composed of a total 21 members, of which 15 seats are public voting and 6 seats are

ex-officio governmental non-voting (Appendix A.) There are 15 alternate public members. The SAC has public representation from four states (Connecticut, Massachusetts, New Hampshire and Maine) and eight Congressional districts. The SAC is among the largest in the national system and is distinguished by its multiple state representation. The SAC will be instrumental in revision of the site's management plan, among other assistance provided.

Public Outreach

As an offshore site, the Sanctuary presents limited direct access to the general public. Yet, three major portals to the Sanctuary provide opportunities for expanded outreach and education - directly by commercial whalewatch vessels and virtually through visitor exhibits and the Sanctuary website. For example:

The New England Aquarium and the Sanctuary entered a partnership in 2000, in which the Aquarium will host several kiosks in an outdoor display that highlights Sanctuary resources and management issues. The Aquarium already offers a 15-minute interactive, multi-screen video production called "Storm Over Stellwagen" in its Immersive Theater. The Sanctuary contracted with the Aquarium to add a 2.5-minute trailer to that production to more fully describe the national system of marine sanctuaries.

The Center for Coastal Studies and the Sanctuary entered a partnership in 2001, wherein the Center hosts and staffs the Sanctuary's Provincetown Visitor Exhibit. The exhibit is a high-tech interactive installation that introduces both the Stellwagen Bank National Marine Sanctuary and the national marine sanctuary system. It is open to the public daily during May through October. The exhibit takes an in-depth look at some of the important resources and research in the Sanctuary as well as ongoing conservation efforts. Other uses are being considered to afford year round benefit to the area's resident population.

The International Wildlife Coalition and the Sanctuary teamed together in 2001 and produced the "See a Spout - Watch Out" campaign to prevent whale strikes by recreational boaters in the Sanctuary. In 2001, over 5,000 boaters were trained; more than 20,000 rack cards and posters and 10,000 decals and stickers were distributed; and 100 metal dockside signs were installed at major departure points to the Sanctuary. Plans are underway to expand the campaign more widely throughout the Gulf of Maine in out-years with possible co-sponsorship by the National Marine Fisheries Service under their "Watchable Wildlife" program.

A new Sanctuary website was developed in 2001 and can be found at http://stellwagen.nos.noaa.gov. The site provides a wealth of data, general information and imagery and will continue to be populated with expanding content. It will host all schedules and products generated during the management plan review and should be regularly consulted. Future plans for the

Sanctuary education and outreach efforts range from school programs, such as "Lefty — the life-sized right whale" to a high-tech interactive visitor exhibit in the Cape Cod town of Provincetown, a gateway to the Sanctuary.

Photographers:
(whale program)
Bob Michelson;
(exhibit) SBNMS staff

Like a modern-day Ahab, a researcher uses techniques modified from whaling days to apply a non-invasive suction cup tag to an endangered whale. The Sanctuary contributes to several cetacean research projects like this, as well as to development of a long-term database of local humpback whales. Researchers identify individual humpbacks by the distinctive patterns on the underside of their flukes.

Photographers: (tagging) SBNMS staff; (fluke pattern) Regina Asmutis-Silvia, IWC

website are to use it as a vehicle for educational and outreach products; these include on-line courses such as a training and certification program for whalewatch naturalists, as well as reports on the science and management of the Sanctuary ecosystem.

The Sanctuary is working to expand its level of outreach to whalewatch companies and their passengers with new brochures, charts and posters. Work is underway to increase the Sanctuary's presence at key whalewatch and boating ports bordering Massachusetts Bay through signage and exhibits.

Water Quality Monitoring

The final National Pollutant Discharge Elimination System permit issued to the Massachusetts Water Resources Authority (MWRA) for its 9-mile sewage outfall pipe into Massachusetts Bay calls for an annual report to the Sanctuary about water quality changes that are impacting, have impacted, or may impact Sanctuary resources. The requirement of the summary report was part of a change to the draft permit at the request of the Sanctuary. The Sanctuary receives notification if the MWRA monitoring program identifies accedences in permit limits. The MWRA outfall project is the largest secondary treatment facility in the nation. The wastewater flow through the outfall started in the fall of 2000; its seaward terminus is located 12.5 miles inshore of the Sanctuary's western boundary.

Although modeling by MWRA suggests there should be no impact on Sanctuary water quality through normal operation of the outfall pipe, there has been significant expression of public concern over potential impacts from anomalous events. To assess this possibility, the Sanctuary established a multi-year water quality monitoring program in 2001. This program interfaces with the Harbor Outfall Monitoring Program supported by MWRA and increases sampling coverage to multiple sites within the Sanctuary. Because of potential public interest in these additional data, they will be available upon request for independent evaluation.

Whale Research

Stellwagen Bank's importance as a major feeding ground for marine mammals was one of the primary reasons for the Sanctuary's designation. The information archive on the whales of Stellwagen Bank is extensive. Many peer-reviewed research publications have been generated based on that archive. The Sanctuary is committed to its continued maintenance and update and is providing the following means of support.

In 2000, the Sanctuary funded research to further understand the resident population of humpback whales on Stellwagen Bank. Little is known about how animals may be using the Bank during migratory transition periods of spring and fall. Year-round monthly cruises in the Sanctuary were conducted to photograph and identify arrival times of individual whales and their associations with other animals. Samples for genetic studies were taken to support research on gender and family lineage.

In 2001, the Sanctuary funded research on whale feeding behavior relative to sand lance distribution and abundance. The sand lance is a major forage species in the Sanctuary. In 2001, a major project was initiated to compile, integrate and analyze over 20 years of spatially referenced data on whale sightings in the Sanctuary. Research results will define spatial-temporal patterns of whale distribution in the Sanctuary and inform management decision-making.

The Sanctuary continues to support analysis of photographs for new whale identifications and co-sponsors the annual whale-naming workshop. Support also is being provided for prototype studies on the impacts of vessel noise on marine mammals.

Whalewatch Guidelines

The Sanctuary and the National Marine Fisheries Service's (NMFS) Office of Protected Resources co-sponsored a brochure in 1999 on revised guidelines for whalewatching in the northeast region. The guidelines provide approach and departure speeds and minimal distance for commercial and recreational boats intent on watching whales. The brochure has been reprinted by NMFS regularly and distributed by both agencies up to the present. Regulations for approach distances for the endangered northern right whale are included in the brochure. In 2000, NMFS issued an Advance Notice of Proposed Rulemaking for whalewatching in the northeast in consultation with the Sanctuary. Draft rules currently are undergoing NMFS review.

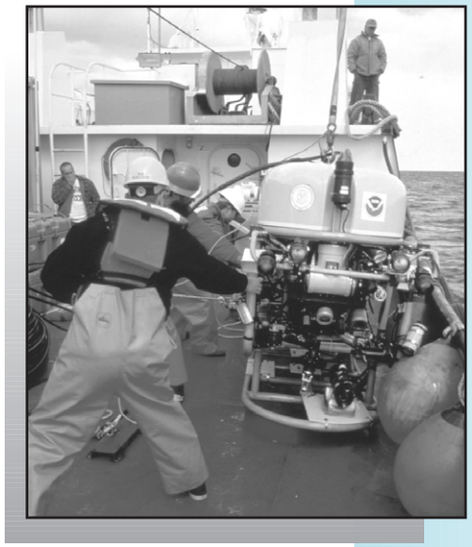
USGS Mapping Project

The US Geological Survey (USGS) completed an initial series of 18 seafloor topographic maps (scale 1:25,000) in 1997 that cover the Sanctuary. The data were collected using a hull-mounted multibeam sonar system. This map series was followed by a sun-illuminated version of the multibeam map in 2001. Additional backscatter and sediment characterization maps are in preparation that will also cover the Sanctuary.

This comprehensive data set already is providing valuable assistance in studies of Sanctuary biodiversity, fish ecology and cultural resources, as noted in subsequent activities. The USGS has incorporated much of these data into a GIS CD-ROM on Massachusetts Bay. The Sanctuary multibeam map, in conjunction with extensive ground truthing (e.g. video, still photos, sediment samples), provides the most complete characterization of the seafloor in the Gulf of Maine.

Called SEABOSS, this unique piece of equipment allows scientists to capture images (both still and video) of the seafloor while sampling the sediments for study at the surface.

Photographer:
U.S. Geological Survey



Remotely-operated vehicles (ROVs), like the MAXROV, allow scientists to spend many hours in areas inaccessible to divers. Sampling an area of the Sanctuary that has been partially closed to fishing reveals diverse seafloor habitat.

Photographers: (MAXROV) Peter Auster; (sponge forest) Peter Auster and Paul Donaldson, NURC-UConn.

Seafloor Habitat Recovery Monitoring Program

This monitoring program is a collaborative effort between scientists at the Sanctuary, the National Undersea Research Center at the University of Connecticut (NURC-UCONN), the University of Maine and Brown University. The program began in 2001 and is planned to continue for 10 years. The specific objectives are to quantify and compare the relative impacts of anthropogenic disturbance (e.g., the laying of the Hibernia fiber optic cable in 2000 and fishing with mobile fishing gear) and natural environmental variation (e.g., storm driven currents) with respect to fish communities, seafloor microhabitat structure, soft-sediment infaunal communities and hard-bottom epifaunal communities.

Sampling is being conducted using a remotely operated vehicle (ROV) and the Sanctuary's Integrated Seafloor Imaging System (ISIS), as well as box cores, side scan sonar and current profilers. The ROV is a robot tethered and controlled from the sea surface, while the ISIS is a passive drift camera with video and still photographic capabilities.

Ecology of Fishes and Seafloor Habitat

The Sanctuary is supporting scientists from the Sanctuary and NURC-UCONN involved in two on-going research projects. Both projects are intended to guide informed consideration of the design, location and effectiveness of potential marine reserves within the Sanctuary. The results of these projects will also inform the process of fisheries management undertaken by the New England Fishery Management Council and should foster collaboration between the agencies.

The first project focuses on the study of fish movement relative to different seafloor habitats. In 2001, a hydrophone array was deployed on the seafloor at a gravel habitat site. A total of 38 Atlantic cod were tagged with acoustic pingers (transmitters) and tracked for up to 4 months. Results indicate significantly higher individual residence times (up to 120 days) over gravel habitat than was previously expected. In 2002 and multiple out-years, additional habitats and additional fish species will be incorporated into the experimental design.

The second project, which began in 1999 and will be completed in 2002, involves the study of species-area relationships for fish and invertebrate taxa in multiple habitats within the Sanctuary. This project entails sampling with an ROV. Results thus far for Year 1 characterize fish diversity over boulder and gravel habitats. These data will be compared to data collected over sand and mud habitats in Year 2.

Western Gulf of Maine Area Closure

The Sanctuary continues to voice support for continuation of the Western Gulf of Maine Area Closure. Specifically, the Sanctuary supports several of the options pending before the New England Fishery Management Council (NEFMC) that either maintain the existing configuration of the closure or extend the boundaries within the Sanctuary to encompass a greater diversity of seafloor habitats. The closure was established by the NEFMC in May 1998 to protect spawning stock of Atlantic cod and other groundfish.

The closure excludes bottom-tending gill nets and mobile fishing gear (such as otter and bottom trawls and scallop dredges) but permits the continued use of shrimp trawls, lobster pots, pelagic purse seining, and hook and line fishing. Because the closure, which incorporates 132 square nautical miles (or about 22%) of the Sanctuary, excludes most bottom-tending fishing gear, it serves as a "reduced impact" reference area for many of the Sanctuary's on-going research projects on seafloor habitat, as described above.

The area of overlap with the Sanctuary is effectively serving as an important habitat research area with results certain to benefit the NEFMC and the Sanctuary. This outcome is compatible with the NEFMC vote in June 2000 to develop a plan and environmental impact statement regarding establishment of a habitat research area in the Gulf of Maine.

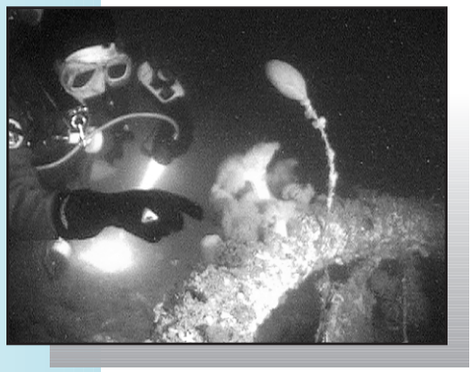
Habitat Use Assessment

In 2001, the Sanctuary began a year-long assessment of human use and marine mammal distribution throughout the Sanctuary. Objectives of the assessment are to: 1) characterize uses, 2) quantify the relative magnitude of use on a seasonal basis, and 3) determine how habitats influence patterns of use and wildlife distributions. Information is collected every month through a standardized, shipboard survey. Data on vessel type, purpose, and location; fixed gear location; and marine mammal species and location are collected. This study replicates an identical assessment completed in 1994-95. Results from both surveys will help establish a baseline of use and contribute to guiding research, education and enforcement efforts.

Submerged Cultural Resources

In 2000, the Sanctuary began to ground truth potential submerged cultural resource targets (numbering around 100) identified using the seafloor topography map provided by the USGS, to ascertain whether they were cultural resources worthy of further investigation. Three targets were investigated in 2000 with the help of the National Ocean Service's Coast Survey, and one of them is of cultural significance. In 2001, divers determined the shipwreck to be wooden and over 243 feet long.

That year, a workshop was held to train Sanctuary staff and volunteers in appropriate procedures and protocols necessary to investigate and properly identify such cultural resources. A research plan is being developed for the site and further investigation is planned for the summer of 2002. The objective of the research is to identify the purpose and name of the vessel as well as any historical significance.



Shipwrecks are the predominant cultural resource in the Stellwagen Bank area, with some 100 possible targets identified on new seafloor maps. Among the most famous wrecks believed to be located within the Sanctuary is the passenger vessel *Portland* which sank in 1898 with all hands aboard.

Photographers: (Portland image) courtesy of The Maine Historical Society; (diver on unidentified wreck) SBNMS Dive Team

Sanctuary enforcement efforts have been greatly aided by the cooperation of other federal and state partners. U.S. Coast Guard air and sea patrols keep an eye out for violations of federal regulations, while a new joint program with the National Marine Fisheries Service and the Massachusetts Environmental Police provides an enforcement presence during high use seasons.

Photographers: (helicopter) SBNMS staff; (boat) MEP website.

Enforcement

The mission of Sanctuary enforcement is to ensure compliance with the National Marine Sanctuaries Act, regulations of the Sanctuary (Appendix B), and (within Sanctuary boundaries) other applicable regulations under the Marine Mammal Protection Act, Endangered Species Act, and the Magnuson-Stevens Fishery Conservation and Management Act, for example. A successful enforcement program requires cooperation between state and federal agencies.

The primary agencies involved in Sanctuary enforcement activities are NMFS Office for Law Enforcement (OLE), NMFS Office of Protected Resources and the Massachusetts Environmental Police (MEP). Additionally, the U.S. Coast Guard has assisted with Sanctuary enforcement and related outreach (through its Auxiliary) in the past, but since has been diverted to other matters. As other operations and asset availability permit, the Coast Guard will continue to assist with monitoring activity in the Sanctuary.

A cooperative enforcement plan for the Sanctuary was instituted between NMFS OLE and the Sanctuary in 2001. Under terms of the plan, agreements were developed that authorize deputization of state enforcement officers (MEP) and provide a funding mechanism. An existing cooperative enforcement agreement between OLE and MEP was amended to specifically authorize the National Marine Sanctuaries Act as one of several federal statutes to be enforced through this relationship.

A pilot project conducted between May and August of 2001, using small patrol boats to intercept vessels in the Sanctuary, was well received by the boating public. On-the-water police action was provided by the MEP acting under agreement with the Sanctuary and coordinated by the NMFS OLE. This enforcement effort was the subject of a nationally syndicated half-hour television show produced by Game Warden Wildlife Journal.

The pilot project focused on interpretive law enforcement by which Sanctuary users were informed on matters of Sanctuary regulation through the distribution of educational outreach information. A greater enforcement effort, transitioning more to detection, investigation and prosecution of violations, inter- and intra-agency coordination, and the sharing of assets is planned, which should lead to consistent enforcement awareness and compliance in the Sanctuary.

For Further Reference

The preceding pages provide a brief introduction to management plan review and describe the background, natural resources, human uses, management functions and ongoing activities of the Sanctuary. To gain broader understanding of these and related topics, consult the following general text on Stellwagen Bank and visit the websites of the regional federal and state agencies mentioned in this report, as well as those of the collaborative Gulf of Maine governmental organizations listed.

Text

Ward, Nathalie. 1995. Stellwagen Bank: a guide to the whales, sea birds, and marine life of the Stellwagen Bank National Marine Sanctuary. 232 p. Down East Books, Camden, ME.

Federal Agency Websites

http://www.sanctuaries.nos.noaa.gov
NOAA National Marine Sanctuaries

http://stellwagen.nos.noaa.gov
Stellwagen Bank National Marine Sanctuary

http://www.nefsc.nmfs.gov/ro/doc/nero.html
National Marine Fisheries Service NE Region

http://www.nefmc.org
New England Fishery Management Council

http://www.nurc.uconn.edu
National Undersea Research Center for the North Atlantic / Great Lakes

http://mpa.gov
Marine Protected Areas of the United States

http://www.nae.usace.army.mil/reg/index.htm
US Army Corp of Engineers New England District (click on DAMOS)

http://www.uscg.mil/d1
US Coast Guard District 1

http://www.epa.gov/region01/index.html
US Environmental Protection Agency Division 1

http://woodshole.er.usgs.gov/project-pages/stellwagen
US Geological Survey Northeast

http://web.mit.edu/seagrant/northeast
NOAA Northeast Sea Grant Program

State Agency Websites

http://www.state.ma.us/czm/czm.htm
Massachusetts Office of Coastal Zone Management

http://www.state.ma.us/dfwele/dmf/dmf_toc.htm
Massachusetts Division of Marine Fisheries

http://www.state.ma.us/dfwele/dle/dle_toc.htm
Massachusetts Environmental Police

http://www.mwra.com
Massachusetts Water Resources Authority

Gulf of Maine Organization Websites

www.gulfofmaine.org
Gulf of Maine Council on the Marine Environment

http://www.gomoos.org
Gulf of Maine Ocean Observing System

Predatory horse star seeking prey in a sand habitat on the southern part of the Stellwagen Bank.

Photographer: US Geological Survey

Deployment of the one man submersible, DeepWorker 2000, off the fantail of the NOAA Ship *Ferrel* during the NOAA/National Geographic Society's Sustainable Seas Expedition to the Sanctuary.

Photographer: SBNMS staff

Appendix A - Stellwagen Bank National Marine Sanctuary Advisory Council

Public members

Research	Mason Weinrich
alternate:	Porter Hoagland, Ph.D.
Research	Peter Auster, Ph.D.
alternate:	Judith Pederson, Ph.D.
Conservation	Susan Farady, J.D.
alternate:	Regina A. Asmutis-Silvia
Conservation	Priscilla M. Brooks, Ph.D.
alternate:	Gib Chase
Education	Peter R. Borrelli
alternate:	Michael S. Connor, Ph.D.
Education	Kevin C. Chu, Ph.D.
alternate:	J. Michael Williamson
Marine Transportation	Frederick L. Nolan, III
alternate:	William C. Eldridge
Recreation	Barry J. Gibson
alternate:	Roger Jarvis
WhaleWatching	Alan G. Hill
alternate:	David A. Slocum
Fixed Gear Commercial Fishing	William A. Adler
alternate:	John W. Pappalardo
Mobile Gear Commercial Fishing	William H. Amaru (Chair)
alternate:	Robert B. MacKinnon
Business/Industry	Jackson S. Kent, III
alternate:	Peter Davidoff
At Large	Richard C. Wheeler
alternate:	Charles Rasak
At Large	Sally Yozell (Vice Chair)
alternate:	Rob Robertson, Ph.D.
At Large	John Williamson (Secretary)
alternate:	Donald R. Hourihan

Governmental members:

State

Richard A. Murray,
Massachusetts
Environmental Police
alternate: Maj. Philip McMann

Thomas W. Skinner,
Office of Coastal
Zone Management
alternate: Susan Snow-Cotter

David Pierce,
Massachusetts Division of
Marine Fisheries

Federal

Paul J. Howard,
New England Fisheries
Management Council
alternate: Doug Hopkins

Kathi Rodrigues,
Northeast Regional Office,
National Marine
Fisheries Service

Lt. Cmdr. Gregory Hitchen,
First Coast Guard District,
U.S. Coast Guard 23

Appendix B - Site Regulations

This summary of activities specifically prohibited by the Stellwagen Bank National Marine Sanctuary regulations is provided for easy reference only. The summary does not include all exemptions or other activities regulated within the Sanctuary under other local, state or federal authorities. The full text of the regulations is published at 15 CFR Part 922.

1) Discharging or depositing in the Sanctuary, any matter except (A) fish, chumming materials or bait used in or resulting from traditional fishing operations in the Sanctuary; (B) biodegradable effluent incidental to vessel use and generated by approved marine sanitation devices; (C) water generated by routine vessel operations (e.g., cooling water, deck wash down and graywater) excluding oily wastes from bilge pumping; and (D) engine exhaust. Also prohibited is discharging or depositing, from beyond the boundary of the Sanctuary, any matter that subsequently enters the Sanctuary and injures a Sanctuary resource or quality (except those listed above).

2) Exploring for, developing or producing industrial materials within the Sanctuary.

3) Drilling into, dredging or otherwise altering the seabed of the Sanctuary; or constructing, placing or abandoning any structure, material or other matter on the seabed of the Sanctuary, except as an incidental result of:
- Anchoring vessels;
- Traditional fishing operations; or
- Installation of navigation aids.

4) Moving, removing or injuring, or attempting to move, remove or injure, a Sanctuary historical resource. This prohibition does not apply to moving, removing or injury resulting incidentally from traditional fishing operations.

5) Taking any marine reptile, marine mammal or seabird in or above the Sanctuary, except as permitted by the Marine Mammal Protection Act (MMPA), the Endangered Species Act (ESA), and the Migratory Bird Treaty Act (MBTA).

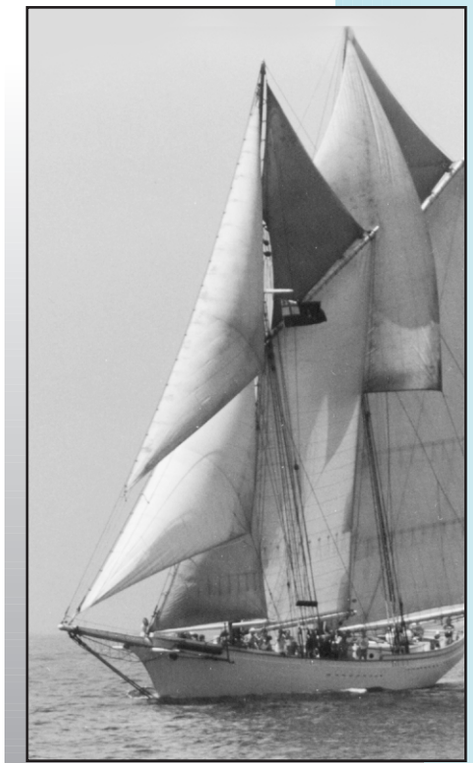
6) Lightering in the Sanctuary.

7) Possessing within the Sanctuary (regardless of where taken, moved or removed from), except as necessary for valid law enforcement purposes, any historical resource, or any marine mammal, marine reptile or seabird taken in violation of the MMPA, ESA or MBTA.

8) Interfering with, obstructing, delaying or preventing an investigation, search, seizure or disposition of seized property in connection with enforcement of the National Marine Sanctuaries Act or any regulation or permit issued under the Act.

Blue sharks are common visitors to the Sanctuary and are important top-level predators in the food chain.

Photographer: Gregory Skomal



Recreational boaters, both power and sail, ply the waters of the Sanctuary between Cape Ann and Cape Cod.

Photographer: David Wiley, IWC

Sanctuary Staff

Craig MacDonald, Ph.D.	Sanctuary Superintendent
Sandi Dentino	Administrative Specialist
Anne Smrcina	Education Coordinator
James Lindholm, Ph.D.	Science Coordinator
Benjamin Cowie-Haskell	Operations and Program Coordinator
Katrina Van Dine, Esq.	Management Plan Review Project Manager
David Wiley, Ph.D.	Switzer Fellow / Marine Mammal Specialist
Steve Kibner	Research Vessel Captain
Joseph Green	NMFS/OLE Enforcement Coordinator (assigned)

Original Map of Stellwagen's Bank. Henry Stellwagen was not only a military officer and hydrographer, but an inventor too. With a sounding device of his own design he was able to sample sediments while determining water depth. Studies to determine seafloor topography and sediment characteristics continue today with the work of the U.S. Geological Survey and NOAA's Coast Survey.

From the Image Archives of the Historical Map & Chart Collection
Office of Coast Survey/National Ocean Service/NOAA

Back Cover Photos (clockwise from top right):

Multi-beam and side-scan sonar surveys provide previously unknown detail for the seafloor in Massachusetts Bay and the Stellwagen Bank National Marine Sanctuary.
Photographer:
U.S. Geological Survey

The Atlantic white-sided dolphin can often be found riding the bow wakes of boats that pass through the Sanctuary.
Photographer:
Regina Asmutis-Silvia, IWC

This large crustacean, the northern lobster was used as fertilizer in Colonial days; it is now considered an epicurean delight.
Photographer:
Bob Michelson

Marine life on the seafloor of the Sanctuary includes a variety of brightly-colored creatures, including this northern red anemone.
Photographer: U.S. Geological Survey

http: //stellwagen.nos.noaa.gov